Amendment to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (currently amended) An image processing apparatus ~~(1)~~ for the reconstruction of time-dependent representations I(x,t) of an object ~~(2)~~, comprising:

- an approximation module with memory storing the N-dimensional parameter vector a(x) of a predetermined parametric model function I*(a(x),t) that approximates the function I(x,t);
- an input module for the reception of a set of projections p^i_j of the object ~~(2)~~ generated at times t^i_j, and
- an estimation module that is adapted to estimate the parameter vector a(x) with the help of said projections p^i_j.

2. (currently amended) ~~An~~ The apparatus according to claim 1, ~~characterized in that it comprises~~ further comprising an evaluation module for the determination of a perfusion map from the representation I*(a(x),t) of a vessel system.

3. (currently amended) ~~An~~ The apparatus according to claim 1, ~~characterized in that~~ wherein the representation I(x,t) and its approximation I*(a(x),t) describe, for each time t_i a cross-sectional image of the object.

4. (currently amended) ~~An~~ The apparatus according to claim 3, ~~characterized in that~~ wherein the estimation of the parameter vector a(x) is based on ~~the~~ an update function $\Delta I(x, p^{i(k)}, I^k(x))$ of an iterative algorithm for the reconstruction of a stationary cross-sectional image I(x), wherein $p^{i(k)}$ is a projection used in the k-th iteration step and $I^k(x)$ is the k-th estimate for I(x).

5. (currently amended) ~~An~~ The apparatus according to claim 4, ~~characterized in that~~ wherein the parameter vector a(x) is iteratively approximated by a sequence $a^k(x)$, and wherein the (k+1)-th iteration comprises the following steps:

a) computation of estimates $I^*(a^k(x),t^i_j)$ for at least N of the times t^i_j, wherein $i \in A$ and $j \in B$ for some index sets A, B;

b) computation of corresponding updates $\Delta I^{k,i}_j = \Delta I(x, p^i_j, I^*(a^k(x),t^i_j))$ with the help of said estimates $I^*(a^k(x),t^i_j)$ and the measured projections p^i_j that correspond to the times t^i_j; and

c) calculation of the new estimate $a^{k+1}(x)$ for the parameter vector a(x) by minimising

$$\chi^2(x) = \sum_{i \in A, j \in B} \left(I^*(\underline{a}^{k+1}(x), t^i_j) - I^*(\underline{a}^k(x), t^i_j) - \Delta I^{k,i}_j(x) \right)^2$$

6. (currently amended) ~~An~~ The apparatus according to claim 1, ~~characterized in that the~~ wherein a set of measured projections p^i_j can be divided into M subsets, and wherein each subset comprises only projections p^i_j, j = 1,...Q taken from the same or approximately the same direction (d^i) at different times t^i_j, and wherein $Q \geq N$.

7. (currently amended) ~~An~~ The apparatus according to claim 1, ~~characterized in that~~ wherein the estimation of the parameter vector a(x) is based on the minimization of an objective function evaluating the deviation between ~~the~~ measured projections p^i_j and corresponding projections $P_i\, I^*(a^k(x),t^i_j)$ calculated from the model function, and wherein the objective function preferably is defined as

$$\chi^2 = \sum_{i,j} \left(p^i_j - P_i I^*(\underline{a}(x), t^i_j) \right)^2$$

8. (currently amended) ~~An~~ The apparatus according to claim 1, ~~characterized in that~~ wherein the estimation of the parameter vector a(x) makes use of an anatomical reference data set.

9. (currently amended) An X-ray examination system, comprising:

- a rotational X-ray apparatus ~~(3)~~ for generating X-ray projections p^i_j of an object ~~(2)~~ from different directions;
- an image processing apparatus ~~(1)~~ coupled to the X-ray apparatus ~~(3)~~ and adapted to estimate based on said projections p^i_j the N-dimensional parameter vector a(x) of a predetermined parametric model function I*(a(x),t) that approximates the representation I(x,t) of the object ~~(2)~~.

10. (currently amended) The system according to claim 9, ~~characterized by an~~ wherein the image processing apparatus ~~(1)~~ for the reconstruction of time-dependent representations I(x,t) of ~~an~~ the object ~~(2), comprising~~ comprises:

- an approximation module with memory storing the N-dimensional parameter vector a(x) of ~~a~~ the predetermined parametric model function I*(a(x),t) that approximates the function I(x,t);
- an input module for the reception of a set of projections p^i_j of the object ~~(2)~~ generated at times t^i_j, and
- an estimation module that is adapted to estimate the parameter vector a(x) with the help of said projections p^i_j.

11. (currently amended) The system according to claim 9, ~~characterized in that~~ wherein the rotational X-ray apparatus is a C-arm system ~~(3)~~ or a multi-slice CT system.

12. (currently amended) The system according to claim 9, further comprising an injection system for injecting a contrast agent into the blood flow of a patient.

13. (currently amended) A method for the reconstruction of time-dependent representations of an object ~~(2)~~, comprising the following steps:

- approximation of the function I(x,t) which describes the representations by a predetermined parametric model function I*(a(x),t); and
- estimation of the N-dimensional parameter vector a(x) with the help of a set of projections p^i_j of the object ~~(2)~~ generated at times t^i_j.

14. (currently amended) The method according to claim 13, ~~characterized in that~~ wherein the projections p^i_j are generated with a C-arm system ~~(3)~~ or a multi-slice CT system.

15. (currently amended) A non-transitory computer readable medium encoded with a computer program for enabling carrying out a method according to claim 14.

16. (currently amended) A non-transitory record carrier on which a computer program according to claim 15 is stored.

17. (currently amended) An X-ray system suitable for determining a 3D dynamic process in an object ~~(2)~~, the system comprising:

an x-ray source and an x-ray detector placed at opposite positions with respect to an examination space and simultaneously rotatable around said examination space for generating a plurality of x-ray projections; and

a data processing unit for deriving from said plurality of x-ray projections a map of ~~the~~ a time dependent 3D dynamic process in the object ~~(2);~~

~~whereby~~ wherein the 3D dynamic process is approximated by a predetermined model with a limited set of parameters~~;~~, and

~~whereby~~ wherein the data processing unit is arranged to estimate parameters in said limited set of parameters out of data in the x-ray projections.

18. (currently amended) The X-ray system according to claim 17, ~~whereby~~ wherein the predetermined model approximates the perfusion of contrast medium in tissue.

19. (currently amended) The X-ray system according to claim 17, ~~whereby~~ wherein the x-ray system is a C-arm x-ray device or a multi-slice CT system.